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OPENCoastS: An open-access service for on-demand coastal predictions

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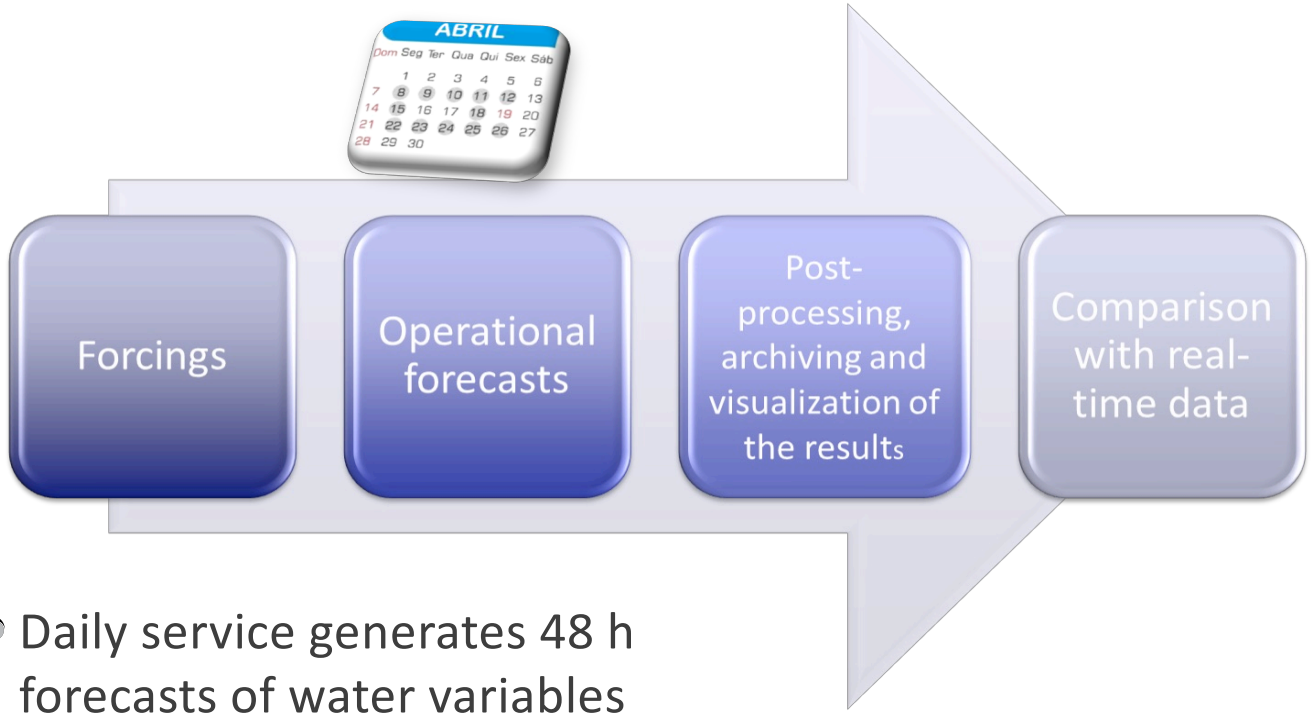
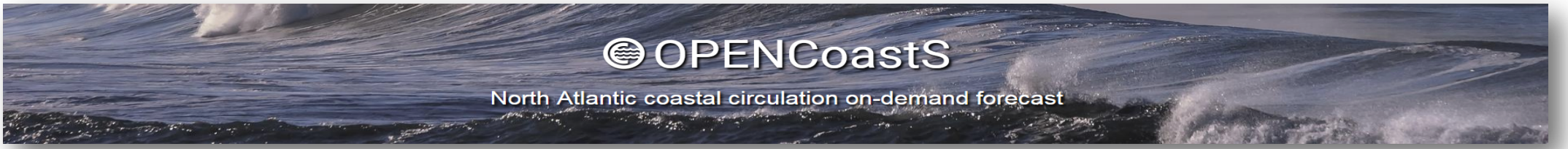
Water forecast systems: concept and context



- Daily service generates 48 h forecasts of water variables
- Web interface provides access to model predictions and field data

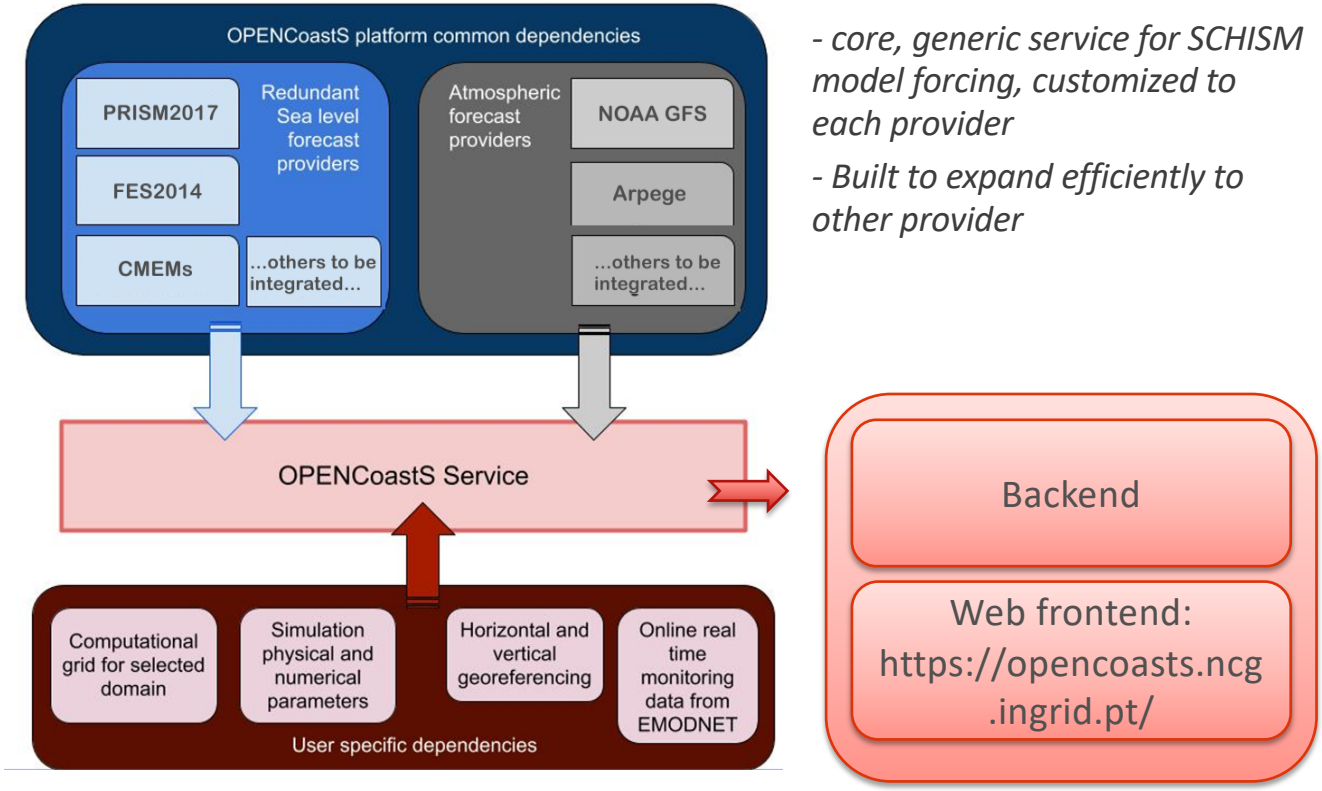
- Antecipate hazard situations and support emergency
- Guide management decisions to minimize risk
- Support water economy daily tasks as well as leisure and recreation

The OPENCoastS service: concept



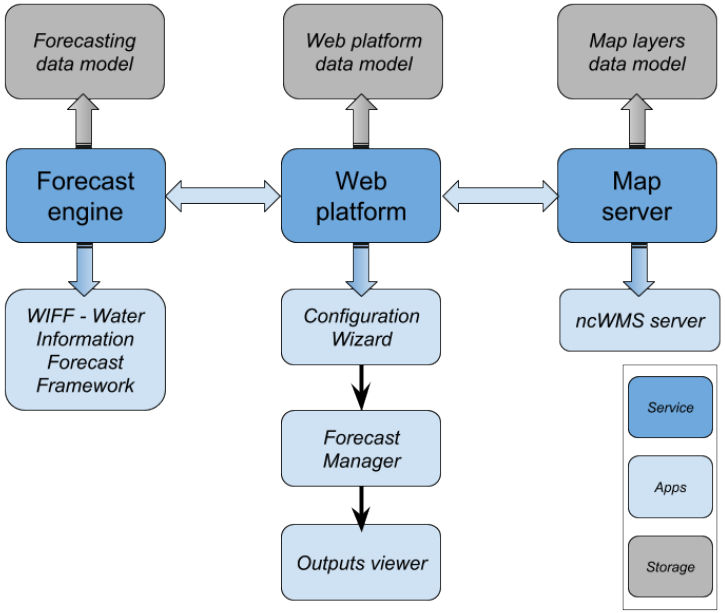
- *A service to:*
  - *Implement forecast systems for a system chosen by the user, using a browser-based, user-friendly, interface*
  - *Make the service flexible in its configuration (forcings, processes and models)*
  - *Allow multiple actions over forecast systems (configure, manage, view results)*
  - *Take advantage of the European Open Science Cloud (EOSC) to provide the required computational resources*

The OPENCoastS platform: architecture and interfaces, integrated with multiple European and Worldwide services



- core, generic service for SCHISM model forcing, customized to each provider

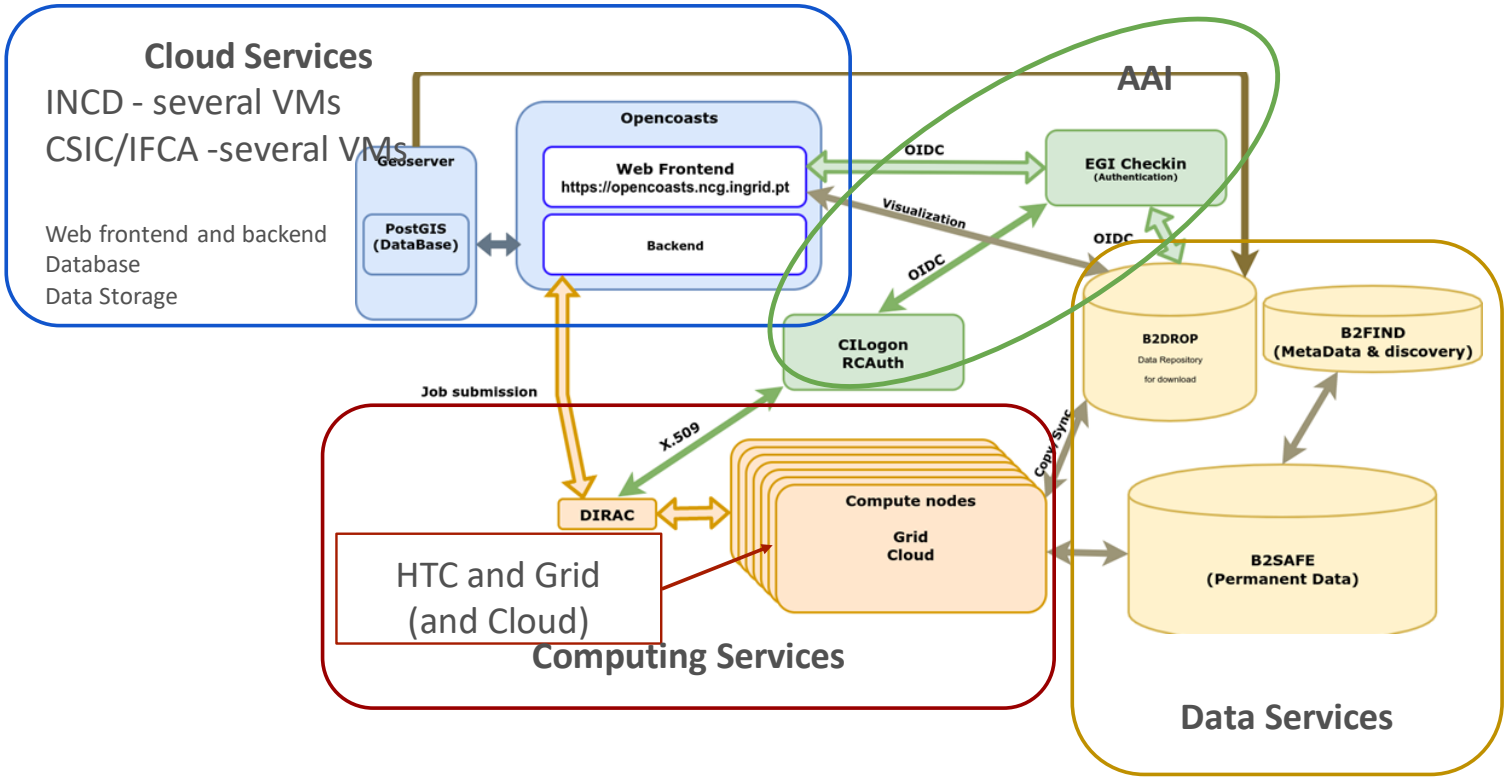
- Built to expand efficiently to other provider



- Need for CPU and storage resources on all 3 services: forecast, web and map server

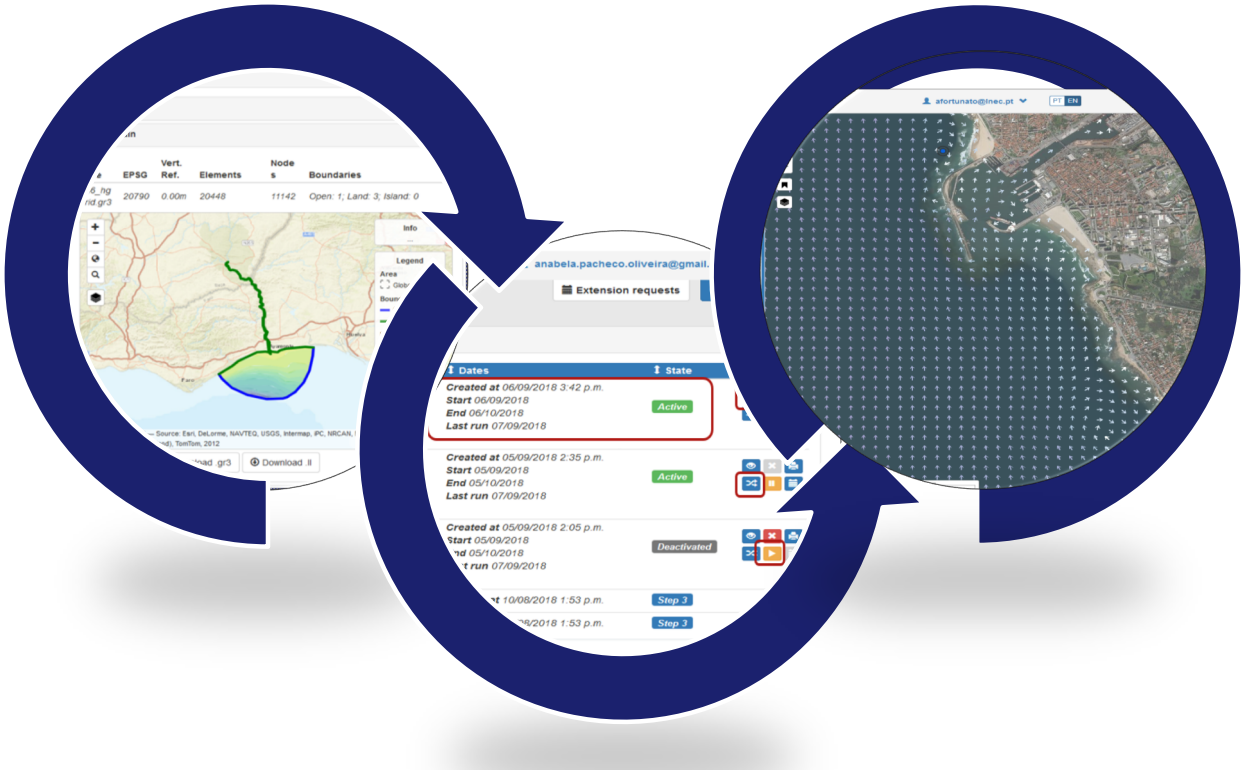
The OPENCoastS platform: integration with EOSC-hub core services

- *Authentication and Authorization:*
  - *EGI check-in (OpenIDConnect) - front-end*
  - *CILogon/RCAuth - X.509 for Computing Elements and DIRAC (robot certificates)*
- *Cloud computing:*
  - *INCD OpenStack cloud integrated in the EGI Fedcloud*
  - *CSIC/IFCA OpenStack cloud integrated in the EGI Fedcloud*
  - *Housing the front-end, back-end and Geo-processing*
  - *Data management: Nextcloud*
  - *Additional cpu for the simulations.*
- *EGI High Throughput Compute service:*
  - *Provides additional computing capacity*
  - *Using Computing Elements (batch clusters) for simulation*
  - *Brokering of compute tasks via DIRAC*
- *EUDAT data management services*
  - *B2Drop: input data, simulation output datasets, visualization.*
  - *B2Safe: permanent storage.*



Web interface: 3 Building blocks

- *Configuration assistant: building a deployment step by step*

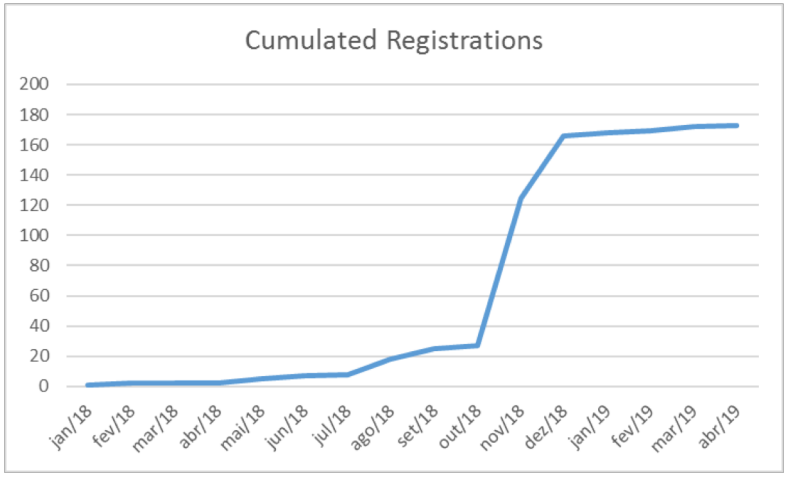


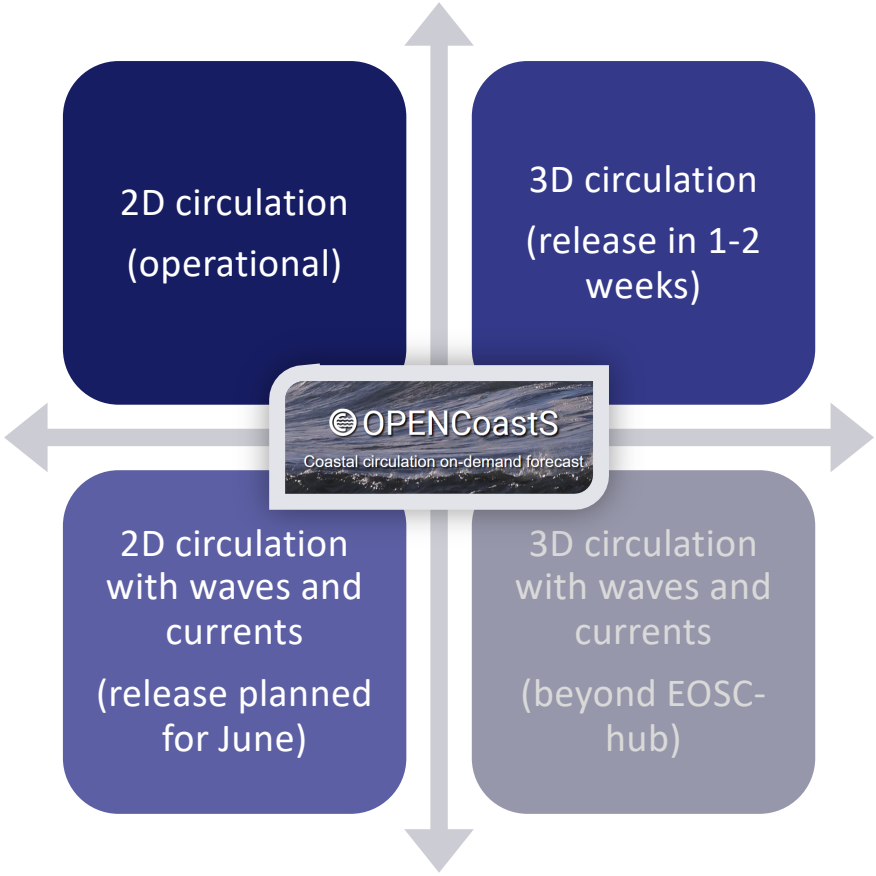
- *Forecast manager – what can we do with our forecasts: check status, check details, clone it, freeze/restart it, delete it,…*

- *Outputs viewer – visualize results:*
  - *Adding data/model points on the fly*
  - *Saving time series and model outputs in your PC*
  - *Compare time series from several deployments*

The 4 dimensions of OPENCOastS: Applicable to multiple uses

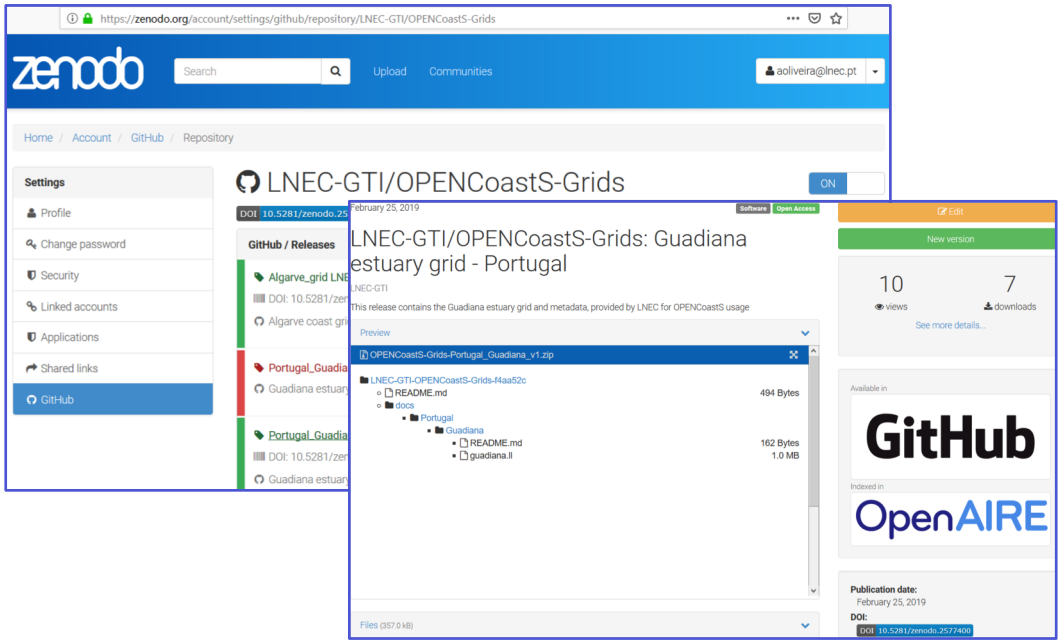
- One model (SCHISM), multiple *flavours* for distinct needs, multiple infrastructure needs
- 2D OPENCoastS figures:
  - In operation inside EOSC-hub for the past 10 months
  - 174 users
  - 133 deployments
  - 2 training events

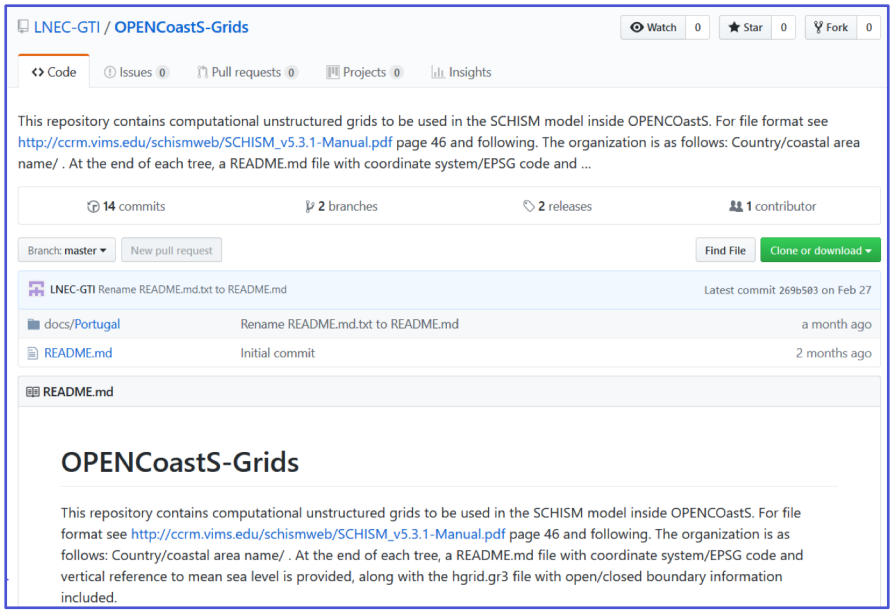




An open data repository for OPENCoastS

- Current limitation:
  - the vast majority of users are from the research community
  - Availability of computational grid limits the coastal managers' use

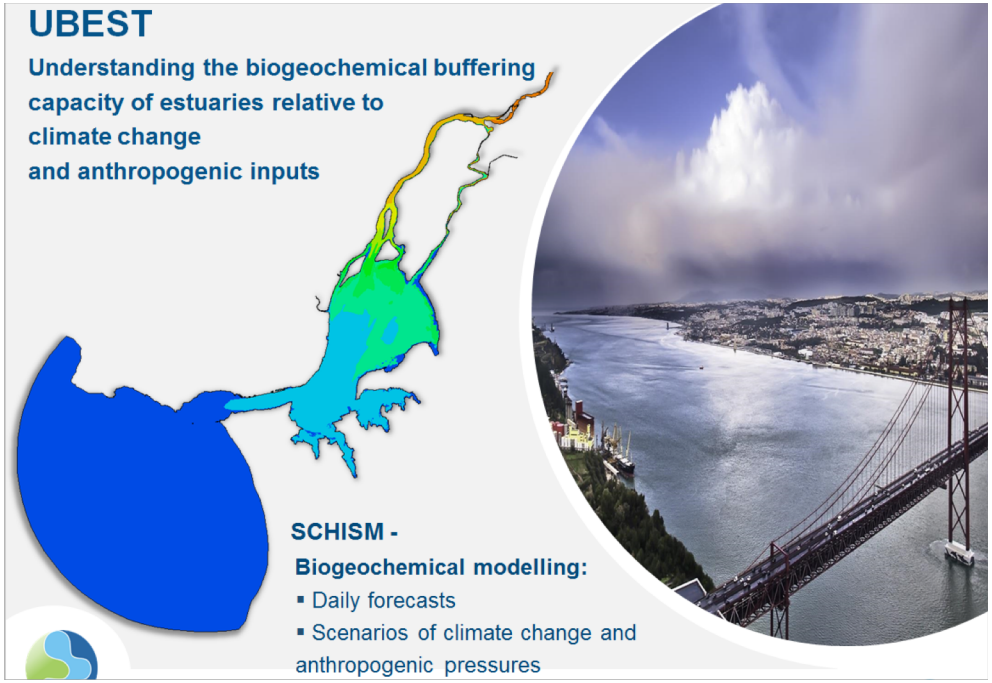




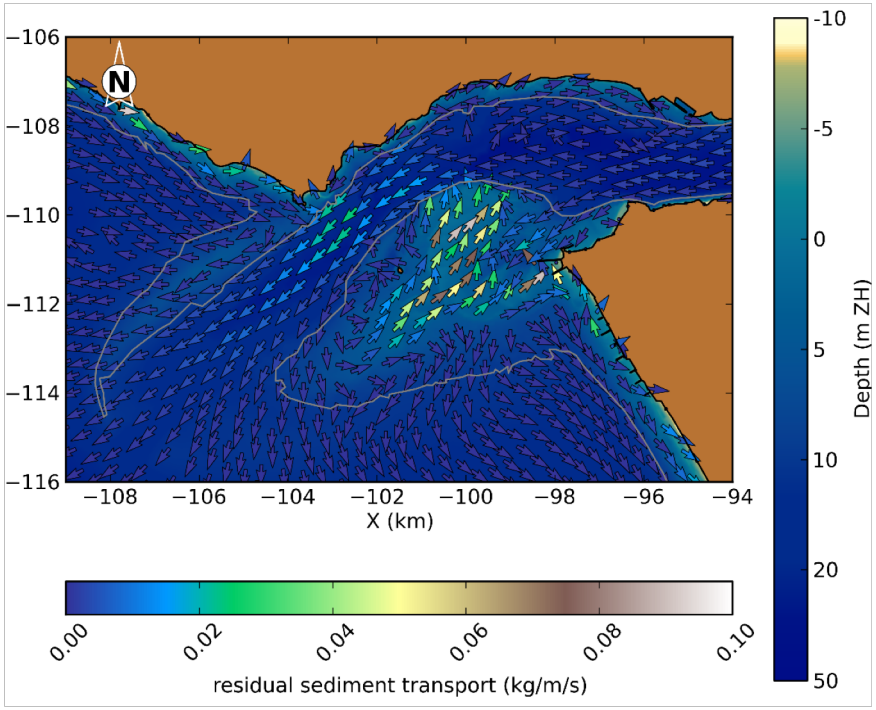
- Strategy:
  - to build a open repository for hosting computational grids
  - This repository is linked to Zenodo to provide a DOI to each shared grid

Earth science applications and EOSC: beyond OPENCoastS

- Climate Change & Biogeochemical studies

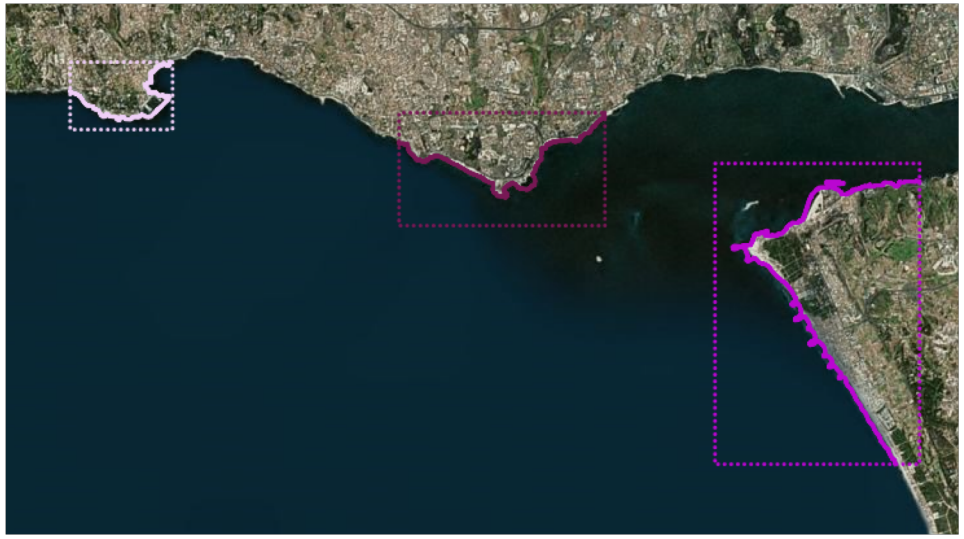


- Simulating inlet morphodynamics



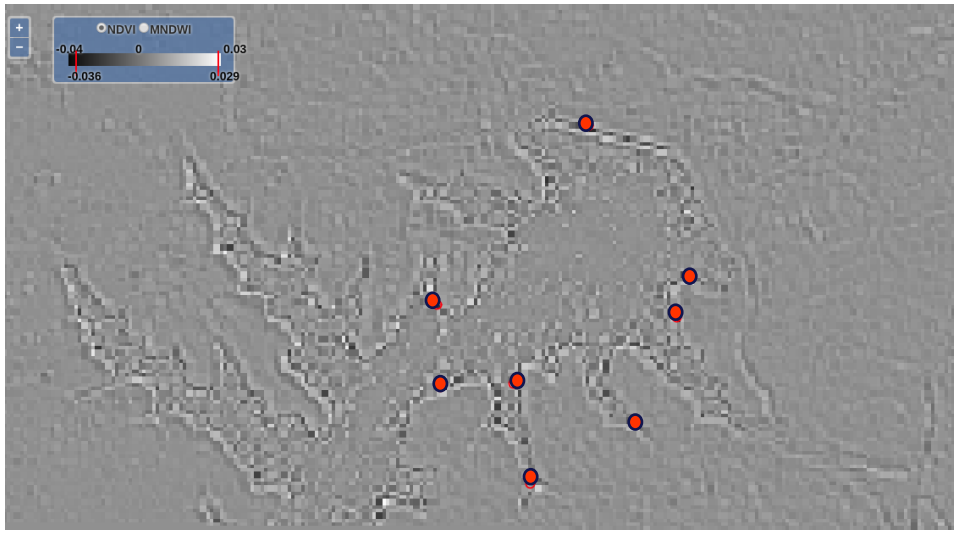
Earth science applications and EOSC: beyond OPENCoastS

- Remote sensing applications based on Sentinel images



Automatic detection of inundation areas

Automatic detection of water leaks in large water distribution networks



Thank you
for your attention!

Questions?

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